IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

1. (currently amended) An apparatus with a dual-writing function comprising:

a first module for controlling an interface to an external apparatus;

a plurality of second modules each having a cache memory; and

a bridge module connected through an interface bus to said first and second modules for accomplishing a connection between said first module and said second modules for data transfer therebetween,

said first module including address designation means for producing addressing information to designate two written-in destinations for writing data to be written, which is received from said external apparatus, through said bridge module into said cache memories of two of said plurality of second modules, and

said bridge module including:

address production means for analyzing said addressing information, which is received together with said data to be written from said first module, to produce two transferred-to addresses for designation of said two second modules having said cache memories in which said data is to be actually written and to produce written-in addresses in said cache memories; and

data transfer control means for controlling data transfer from said bridge module to said second modules so that, after said data is transferred to the two second modules corresponding to said two transferred-to addresses, said data is written at said written-in address in said cache memory of each of the two second modules,

wherein

said two second modules are set in mirror relation to each other,

one of the two second modules includes management means for managing information on the other of the two second modules and for managing an association between a master area address in said cache memory of the one second module and a mirror area address in said cache memory of the other second module, and

2

said address designation means of said first module produces said addressing information on the basis of information acquired from said management means of any one of the two second modules, and

a master area of said one second module and a mirror area of said other second module are written to until the master area of said one second module is full, at which time said a mirror area of said one first second module are written.

2. (previously presented) The apparatus with a dual-writing function according to claim 1, wherein said address designation means designates, in said addressing information, a page address in said cache memory of each of said second modules and an offset address in a page designated by said page address, as said written-in address for said data in said cache memory.

3. (original) The apparatus with a dual-writing function according to claim 2, wherein said address designation means designates, in said addressing information, specific information for specifying said two second modules having said cache memories in which said data is to be actually written, as said two transferred-to addresses for said data.

4. (previously presented) The apparatus with a dual-writing function according to claim 3, wherein said interface bus is a PCI (Peripheral Component Interconnect) bus, and numbers for specifying said PCI bus for said two second modules are designated as said specific information.

5-8. (canceled)

9. (currently amended) The apparatus with a dual-writing function according to claim 1, wherein, in a case in which a capacity of a master area of said cache memory of the one second module runs short is full when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module preserves the readout data in a mirror area of said cache memory of the other second module on the basis of a situation of management by said management means.

10. (currently amended) The apparatus with a dual-writing function according to claim 2, wherein, in a case in which a capacity of a master area of said cache memory of the one

second module is full~~runs short~~ when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module preserves the readout data in a mirror area of said cache memory of the other second module on the basis of a situation of management by said management means.

11.   (currently amended) The apparatus with a dual-writing function according to claim 3, wherein, in a case in which a capacity of a master area of said cache memory of the one second module is full~~runs short~~ when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module preserves the readout data in a mirror area of said cache memory of the other second module on the basis of a situation of management by said management means.

12.   (currently amended) The apparatus with a dual-writing function according to claim 4, wherein, in a case in which a capacity of a master area of said cache memory of the one second module is full~~runs short~~ when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module preserves the readout data in a mirror area of said cache memory of the other second module on the basis of a situation of management by said management means.

13.   (currently amended) An apparatus with a dual-writing function comprising:
        a first module for controlling an interface to an external apparatus;
        a plurality of second modules each having a cache memory; and
        a bridge module connected through an interface bus to said first and second modules for accomplishing a connection between said first module and said second modules for data transfer therebetween,
        said first module writing data to be written, which is received from said external apparatus, through said bridge module into said cache memories of two of said plurality of second modules,
        said two second modules are set in mirror relation to each other, and
        one of the two second modules including management means for managing information on the other of the two second modules and for managing an association between a master area address in said cache memory of the one second module and a mirror area address in said cache memory of the other second module,

wherein, in a case in which a capacity of a master area of said cache memory of the one second module is full~~runs short~~ when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module preserves the readout data in a mirror area of said cache memory of the other second module on the basis of a situation of management by said management means, and

a master area of said one second module and a mirror area of said other second module are written to until the master area of said one second module is full, at which time ~~said~~ a mirror area of said one second ~~first~~ module are written.

14. (canceled)

15. (currently amended) A storage control apparatus placed between a disk unit and a host for controlling access to said disk unit by said host, said storage control apparatus comprising:

a disk interface module for controlling an interface to said disk unit;

a host interface module for controlling an interface to said host;

a plurality of management modules, each including a cache memory, for controlling the entire apparatus; and

a bridge module connected through an interface bus to said disk interface module, said host interface module and said management modules for making connections among said disk interface module, said host interface module and said management modules for data transfer among said disk interface module, said host interface module and said management modules,

said host interface module including:

address designation means for producing addressing information to designate two written-in destinations for writing data to be written, which is received from said host, through said bridge module into said cache memories of two of said plurality of management modules, and

said bridge module including:

address production means for analyzing said addressing information, which is received together with said data to be written from said host interface module, to produce two transferred-to addresses for designation of said two management modules having said cache memories in which said data is to be actually written and to produce written-in addresses in said cache memories; and

5

data transfer control means for controlling data transfer from said bridge module to said management modules so that, after said data is transferred to the two management modules corresponding to said two transferred-to addresses, said data is written at said written-in address in said cache memory of each of the two management modules,

wherein

said two management modules are set in mirror relation to each other,

one of the two management modules includes management means for managing information on the other of the two management modules and for managing an association between a master area address in said cache memory of the one management module and a mirror area address in said cache memory of the other management module, and

said address designation means of said host interface module produces said addressing information on the basis of information acquired from said management means of any one of the two management modules, and

a master area of said one second module and a mirror area of said other second module are written to until the master area of said one second module is full, at which time said a mirror area of said one second first module are written.

16.   (previously presented) The storage control apparatus according to claim 15, wherein said address designation means designates, in said addressing information, a page address in said cache memory of each of said management modules and an offset address in a page designated by said page address, as said written-in address for said data in said cache memory.

17.   (original) The storage control apparatus according to claim 16, wherein said address designation means designates, in said addressing information, specific information for specifying said two management modules having said cache memories in which said data is to be actually written, as said two transferred-to addresses for said data.

18.   (previously presented) The storage control apparatus according to claim 17, wherein said interface bus is a PCI (Peripheral Component Interconnect) bus, and numbers for specifying said PCI bus for said two management modules are designated as said specific information.

19-22. (canceled)

23.   (currently amended) The storage control apparatus according to claim 15, wherein, in a case in which a capacity of a master area of said cache memory of the one management module is full~~runs short~~ when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, the one management module preserves the readout data in a mirror area of said cache memory of the other management module on the basis of a situation of management by said management means.

24.   (currently amended) The storage control apparatus according to claim 16, wherein, in a case in which a capacity of a master area of said cache memory of the one management module is full~~runs short~~ when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, the one management module preserves the readout data in a mirror area of said cache memory of the other management module on the basis of a situation of management by said management means.

25.   (currently amended) The storage control apparatus according to claim 17, wherein, in a case in which a capacity of a master area of said cache memory of the one management module is full~~runs short~~ when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, the one management module preserves the readout data in a mirror area of said cache memory of the other management module on the basis of a situation of management by said management means.

26.   (currently amended) The storage control apparatus according to claim 18, wherein, in a case in which a capacity of a master area of said cache memory of the one management module is full~~runs short~~ when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, the one management module preserves the readout data in a mirror area of said cache memory of the other management module on the basis of a situation of management by said management means.

27.   (currently amended) A storage control apparatus placed between a disk unit and a host for controlling access to said disk unit by said host, said storage control apparatus comprising:

a disk interface module for controlling an interface to said disk unit;

a host interface module for controlling an interface to said host;

a plurality of management modules for controlling the entire control apparatus; and

a bridge module connected through an interface bus to said disk interface module, said host interface module and said management modules for making connections among said disk interface module, said host interface module and said management modules for data transfer among said modules,

said host interface module writing data to be written, which is received from said host, through said bridge module into cache memories of two of said plurality of management modules,

said two management modules are set in mirror relation to each other, and

one of the two management modules including management means for managing information on the other of the two management modules and for managing an association between a master area address in said cache memory of the one management module and a mirror area address in said cache memory of the other management module,

wherein, in a case in which a capacity of a master area of said cache memory of the one management module is full~~runs short~~ when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, the one management module preserves the readout data in a mirror area of said cache memory of the other management module on the basis of a situation of management by said management means, and

a master area of said one second module and a mirror area of said other second module are written to until the master area of said one second module is full, at which time ~~said~~ a mirror area of said one second ~~first~~ module are written.

28.   (canceled)

29.   (currently amended) An apparatus comprising:

a first module controlling an interface to an external apparatus;

a plurality of second modules each having a cache memory; and

8

a bridge module connected through an interface bus to said first and second modules for accomplishing a connection between said first module and said second modules for data transfer therebetween,

said first module including an address designator producing addressing information to designate two written-in destinations for writing data to be written, which is received from said external apparatus, through said bridge module into said cache memories of two of said plurality of second modules, and

said bridge module including:

address production producer analyzing said addressing information, which is received together with said data to be written from said first module, and producing two transferred-to addresses for designation of said two second modules having said cache memories in which said data is to be actually written and producing written-in addresses in said cache memories; and

data transfer controller controlling data transfer from said bridge module to said second modules so that, after said data is transferred to the two second modules corresponding to said two transferred-to addresses, said data is written at said written-in address in said cache memory of each of the two second modules,

wherein

said two second modules are set in mirror relation to each other,

one of the two second modules includes a manager managing information on the other of the two second modules and managing an association between a master area address in said cache memory of the one second module and a mirror area address in said cache memory of the other second module, and

said address designator of said first module produces said addressing information on the basis of information acquired from said manager of any one of the two second modules, and

a master area of said one second module and a mirror area of said other second module are written to until the master area of said one second module is full, at which time said a mirror area of said one second first module are written.

30.   (currently amended) An apparatus comprising:
a first module controlling an interface to an external apparatus;
a plurality of second modules each having a cache memory; and

a bridge module connected through an interface bus to said first and second modules for accomplishing a connection between said first module and said second modules for data transfer therebetween,

said first module writing data to be written, which is received from said external apparatus, through said bridge module into said cache memories of two of said plurality of second modules,

said two second modules are set in mirror relation to each other, and

one of the two second modules including a manager managing information on the other of the two second modules and managing an association between a master area address in said cache memory of the one second module and a mirror area address in said cache memory of the other second module,

wherein, in a case in which a capacity of a master area of said cache memory of the one second module is full~~runs short~~ when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module preserves the readout data in a mirror area of said cache memory of the other second module on the basis of a situation of management by said manager, and

a master area of said one second module and a mirror area of said other second module are written to until the master area of said one second module is full, at which time ~~said~~ a mirror area of said one second ~~first~~ module are written.

31.   (currently amended) An apparatus comprising:

a host interface module controlling an interface to an external device, the host interface module producing an address designation;

a plurality of management modules each having a cache memory, at least two of the plurality of management modules set in mirror relation to each other, a ~~write of~~ data written to a master area of a first management module simultaneously written to a mirror area of a second management module, the first management module of controlling the master area of the first management module and the mirror area of the second management module; and

a bridge module connecting the host interface module and the plurality of management modules, the bridge module producing address information for two transfer to addresses for the data written to ~~of~~ the at least two management modules of the plurality of management modules.

32.   (currently amended) A method of efficiently using a mirrored cache, the method comprising:

determining whether a master area of a first memory module is ~~running short of space~~insufficient for a data input request; and

storing data initially directed to the master area of a first memory module in a mirror area of a second memory module.